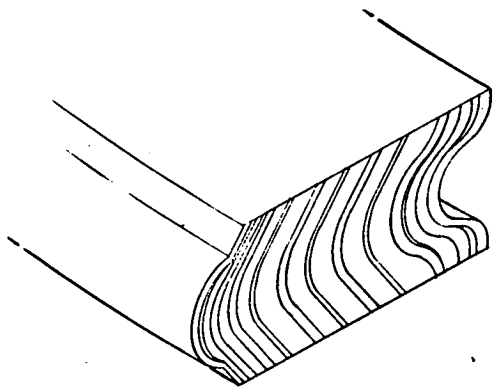
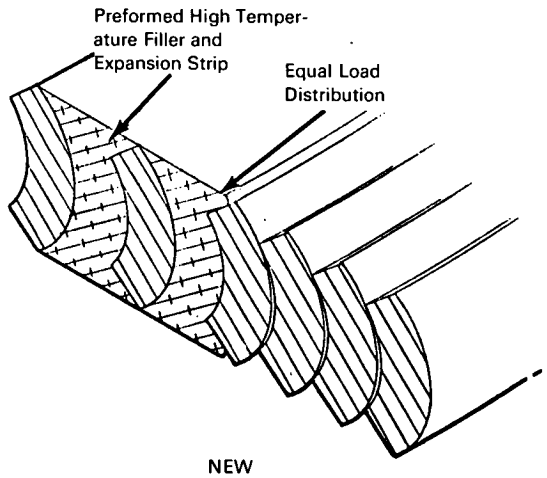
NASA TECH BRIEF

Development of Helical Seal for High Temperature (2000° F) Application



OLD CONFIGURATION



NEW CONFIGURATION

The problem:

To design a helical seal to be used to seal bolted flange joints in a high temperature (2000°F) environment. Commercially available seals have not been satisfactory in high temperature applications (1400°F). In use, the seal is compressed between two flanges and upon loosening the flange bolts, the seal is incapable of recovering its original state.

The solution:

A seal design incorporating a new cross-sectional shape, a metal strip with a slight radius, and the use of premolded asbestos.

How it's done:

The proposed helical seal may be constructed as follows: Feed a 1/4-inch by 0.010-inch thick steel strip through a tooling setup in a manner to bend the strip on a 0.075 radius. Immediately after bending, cut the strip at approximately 40 degrees. Then spiral wind the strip in a fixture to a diameter equal to a specific sealing-area flat, dependent upon the environment in which it is used. This winding process includes from 5 to 10 winds, after which an asbestos strip saturated with a high-temperature sealant is coiled with the curved strip, resulting in a high-temperature expansion strip between each metal strip after the 5 to 10 initial winds. The asbestos stripping is then cut prior to the last 5 to 10 winds. The solid winds at the beginning and end of each wind should create a sufficient thickness of material for tack welding the assembly to prevent any unwinding during the life or use of the seal. The asbestos used between windings is molded, rolled, or extruded to a configuration matching that of its mating metal strip.

Notes:

1. This new design may provide equal load distribution under compression loads, allow for minimum loss and recovery values, and increase temperature range from 1400° to 2500°F.

(continued overleaf)

2. This development is in conceptual stage only, and as of date of publication of this Tech Brief, neither a model nor prototype has been constructed.
3. Inquiries concerning this concept may be directed to:

   Technology Utilization Officer
   Marshall Space Flight Center
   Huntsville, Alabama 35812
   Reference: B67-10655

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: C. Held
of North American Aviation, Inc.
under contract to
Marshall Space Flight Center
(MFS-13304)